

EXCAVATIONS AT WHITIPIRORUA, T12/16, COROMANDEL PENINSULA

LOUISE FUREY

AUCKLAND

Abstract. Excavations at Whitipirorua, or Onemana, were carried out in 1986 and 1988, providing information to enable the large collection of artefacts previously recovered from the site to be put into an archaeological perspective.

An early or Archaic beach midden, the site has three distinct periods of occupation. Radiocarbon age estimates indicate that occupation occurred in the 14th and 15th centuries.

Shell midden, firescoops, postholes and a pit were found. Midden remains were typical of a Coromandel Peninsula Archaic site. Local stone materials of chert and obsidian were utilised along with imported obsidian and basalt. Artefacts were scarce in the excavated area.

Whitipirorua is interpreted as a large occupation site, tending to the more permanently occupied end of the settlement pattern spectrum.

T12/16 is situated on the beach front at Onemana on the eastern side of the Coromandel Peninsula (Fig. 1) and is commonly referred to as Whitipirorua, the traditional name for the area. Archaeologists have been aware of the site for a number of years and periodically artefacts were collected as they were exposed on the surface through sand deflation. Many of the artefact types identified the site as belonging to the early settlement, or Archaic, period.

The site was first brought to the attention of archaeologists by R.G.W. (Bob) Jolly who regularly visited Whitipirorua from the early 1960s to the mid-1970s. During this period part of the site was exposed and cultural material was visible on the surface. Artefacts and samples collected by Jolly are held in the Auckland Museum and have been described by Furey (1990). Like many similar sites on the beach dunes of the Coromandel Peninsula, Whitipirorua was partially destroyed during construction of a housing subdivision in the mid-1970s.

A further threat to the site was brought to the author's attention in 1986 when the management plan for the recreation reserve within which the site is situated showed that a dinghy ramp was to be constructed through the remaining part. After negotiation the Thames Coromandel District Council, as reserve administrators, agreed to protect the site by placing a clay capping over the exposed cultural layers if it could be shown that a sufficient amount of the site remained to justify this. At the same time a research project would allow recovery of information about the site stratigraphy which might enable the artefact collection to be placed in context. In

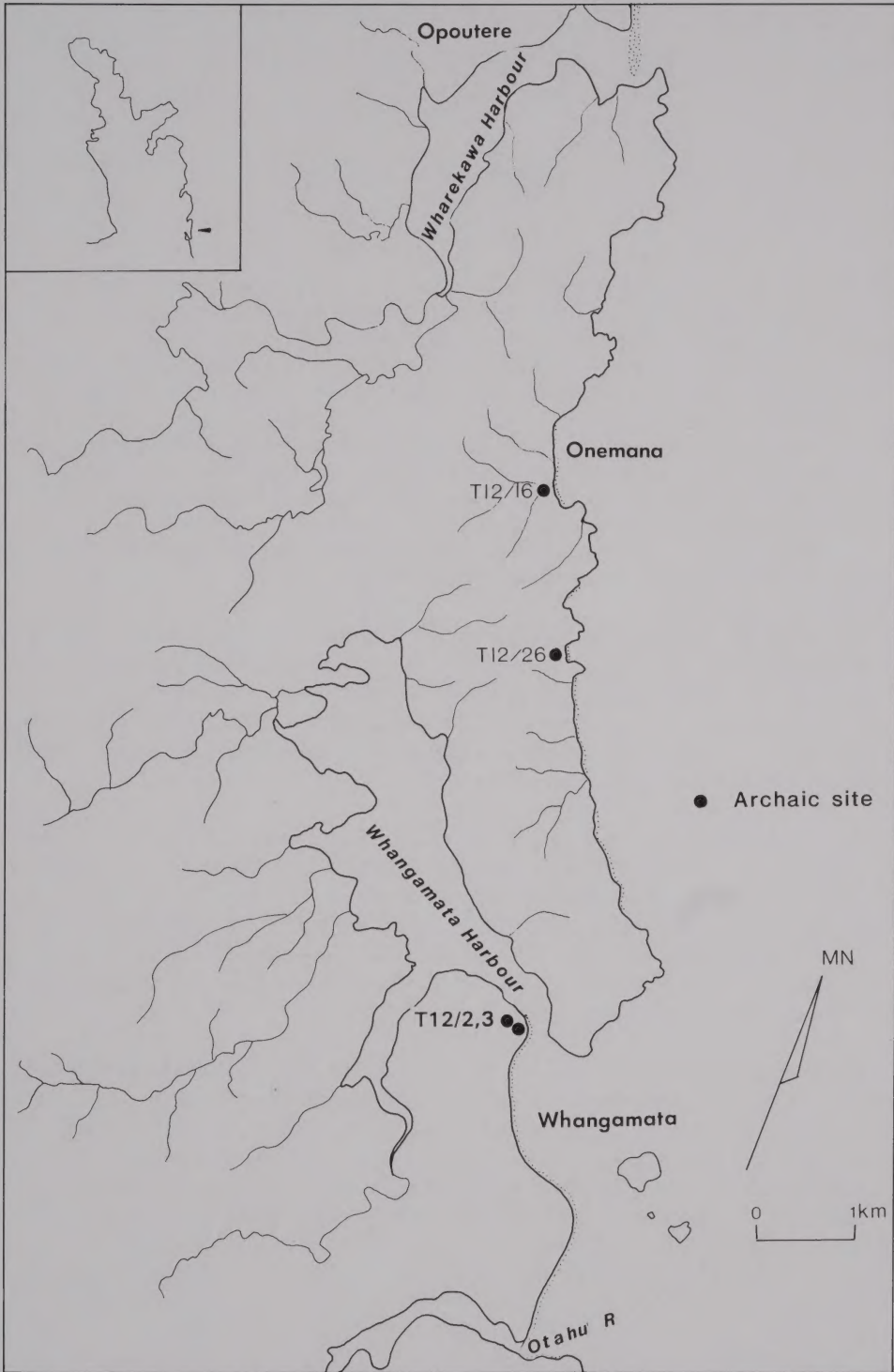


Fig. 1. Locality map.

addition a radiocarbon date, or series of dates, would contribute to data on early settlement of the Coromandel east coast.

The setting

Onemana Beach is approximately 900 m long and has one main stream which discharges near the centre of the beach, with another intermittent water course at the southern end. The site, T12/16, is situated between these two streams. A rocky headland with pa (T12/23) is situated at the south end of the beach, while to the north cliffs and steep slopes back the sand beach for approximately 400 m. T12/21, also a pa, is at the northern end of the main dune area (Fig. 2). The beach itself shelves steeply and the only boat launching area is at the southern end.

Behind the dune area are spurs which join to a central ridge system running along Whitiwhirua Peninsula from Whangamata Harbour north to Wharekawa Harbour. During earthworks for the residential subdivision the toe ends of the spurs were recontoured and spoil pushed forward, covering part of the dune area.

Whitiwhirua Peninsula is the source of several stone materials important to the Maori. Chert and obsidian both occur here. Outcrops of chert are present on the central ridge behind Onemana Beach although none show evidence of having been utilised in any way (J. Coster pers. comm.). Obsidian, in boulder or cobble form, occurs through clay subsoil on the spurs behind the dune area at Onemana, and also in stream beds and beaches on the western side of the Whitiwhirua Peninsula, fronting the Whangamata Harbour. This local obsidian is present in the site.

Jolly excavations

Jolly carried out excavations at Whitiwhirua over a number of years. His attention was drawn to the site in 1956 when evidence of fishhook manufacturing was exposed by erosion (Jolly 1978a:129). Over the years Jolly concentrated on this part of the site near the stream. The main focus of activity was referred to as 'Site 1' and 'Site 2' (also named 'Molly's Site') although many other excavations, variously named 'Top Site' and 'Eggshell Square', were also investigated. Stratigraphic information from all of this work is sketchy and plans and maps non-existent.

Jolly (1978a:130) described a generalised stratigraphy: "The main culture layer is beneath sand with ordinary shell midden above. In some places the layer is about 30 cm thick, in others about 1 metre. Mussels must have been easily obtained by the first comers as many shells rest close to the natural sand." Many of the artefacts came from a layer of dark sand in which no shell midden was present (M. Hougaard pers. comm. 1988). Although Jolly refers to 'Site 1' and 'Site 2', they were, in Hougaard's opinion, part of the same activity area.

In 1964 Molly Nicholls (later Hougaard) made a sketch map of the exposed parts of the site, including the locations of 'Site 1' and 'Site 2' (Jolly 1978a:131). With the assistance of aerial photographs of 1966 and 1978, some of these site features have been identified and located in relation to the present day topography (Fig. 2). From Nicholls' map it is apparent that there were concentrations of certain activities, for

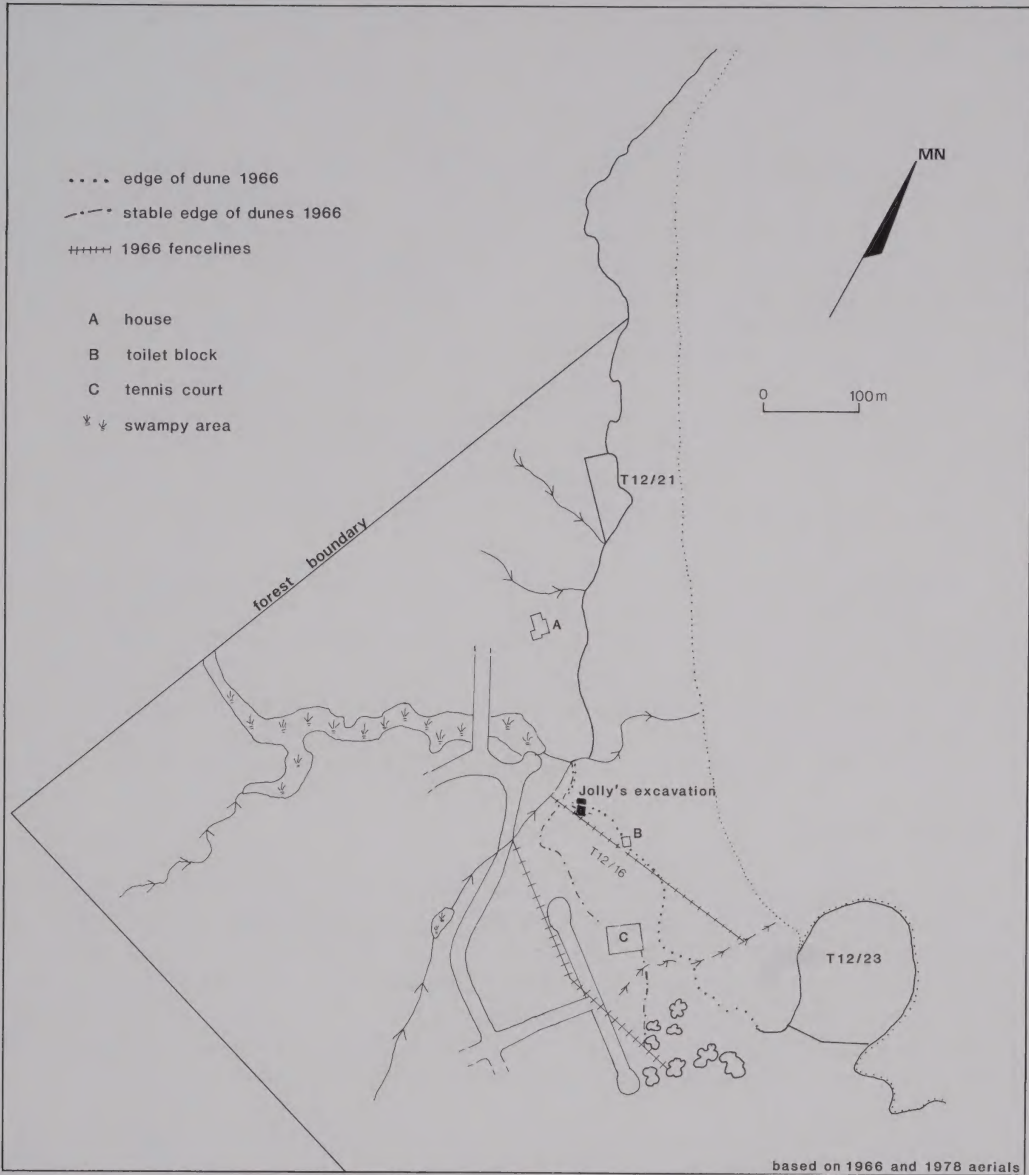


Fig. 2. Whitipirorua site, Onemana, showing location of Jolly's excavations.

example stone flaking below the present tennis court and toilet block, and a black discolouration of the sand approximately mid-way between the two (this was identified in the 1986 and 1988 excavation squares 5-8 in the same location).

By 1974 the subdivision development was underway. The area near Jolly's excavations was being quarried for sand to act as a bedding material in pipe trenches. Material exposed during this operation has been described as containing "basalt, chert and obsidian flakes and fragments of rectangular basalt adzes" (Jeremy Spencer pers. comm. 1987).

ARCHAEOLOGICAL EXCAVATIONS 1986 and 1988

The site in 1986 was evident on the seaward side of the dune as an exposed brown or black cultural layer with displaced shell midden, stone flakes and general stone material. Cultural material has been evident on the surface for a number of years and the eroding edge in one place has moved landwards by nearly 10 m since the mid-1970s, based on author's observations.

The 1986 excavation strategy was to open up a number of squares immediately behind the eroding edge of the cultural layers. However, the available area was limited to within the uncapped sand dune as the amount of effort required to remove clay overburden was not warranted for the short fieldwork period, nor was it desirable as that part of the site was already well protected from erosion.

Six 2 x 2 m squares (numbered 1-6) were excavated over five days in 1986 (N.Z. Historic Places Trust Permit 1986/29). In addition, several testholes were dug or augered to the north of the toilet block to locate any remaining evidence of the site in the vicinity of Jolly's excavations (Fig. 3).

In 1988 two further 2 x 2 m squares (numbered 7 and 8) were excavated (N.Z.H.P.T. Permit 1988/8) to clarify problems in stratigraphic interpretation.

STRATIGRAPHY

Square 1. This consisted of an isolated knoll of apparently intact cultural material surrounded by an area of deflated sand littered with stone flakes and midden.

A dark brownish-black sand, 50-160 mm in thickness, was excavated and contained charcoal, shell and fish bone. This rested on light brown sterile sand. At the interface of the two layers were a number of dog coprolites containing fish bone fragments. These items provided a distinctive marker layer which occurred over most of the excavated area of the site. Sterile white beach sand underlay the culturally deposited layers.

Within the excavated square a piece of worked paua shell with notches along one side was recovered from deflated sand. Artefacts previously recovered from the vicinity of this 'island' of intact material include bone needles and several similarly shaped pieces of worked paua shell (Furey 1990:36).

Square 2. Placed over the eroding face of the occupation material, this square had evidence of several cultural layers separated by sterile sand (Fig. 4).

Layer 1, common to all the site, was windblown sand. Below was grey greasy sand containing shell which was identified as Layer 2. Shell included abundant *Chione stutchburyi* (cockle), *Perna* sp. (mussel) and *Paphies australis* (pipi), also *Turbo smaragdus* (cat's eye), *Nerita melanotrogus* (black nerita), *Amphibola crenata* (mudsnail), *Cominella* sp. (speckled whelk), *Struthiolaria papulosa* (ostrich foot), *Thais orbita* (white rock shell), *Haliotis* sp. (paua) and *Crassostrea glomerata* (oyster). No identifiable bone was recovered but small brown smudges within the sand were

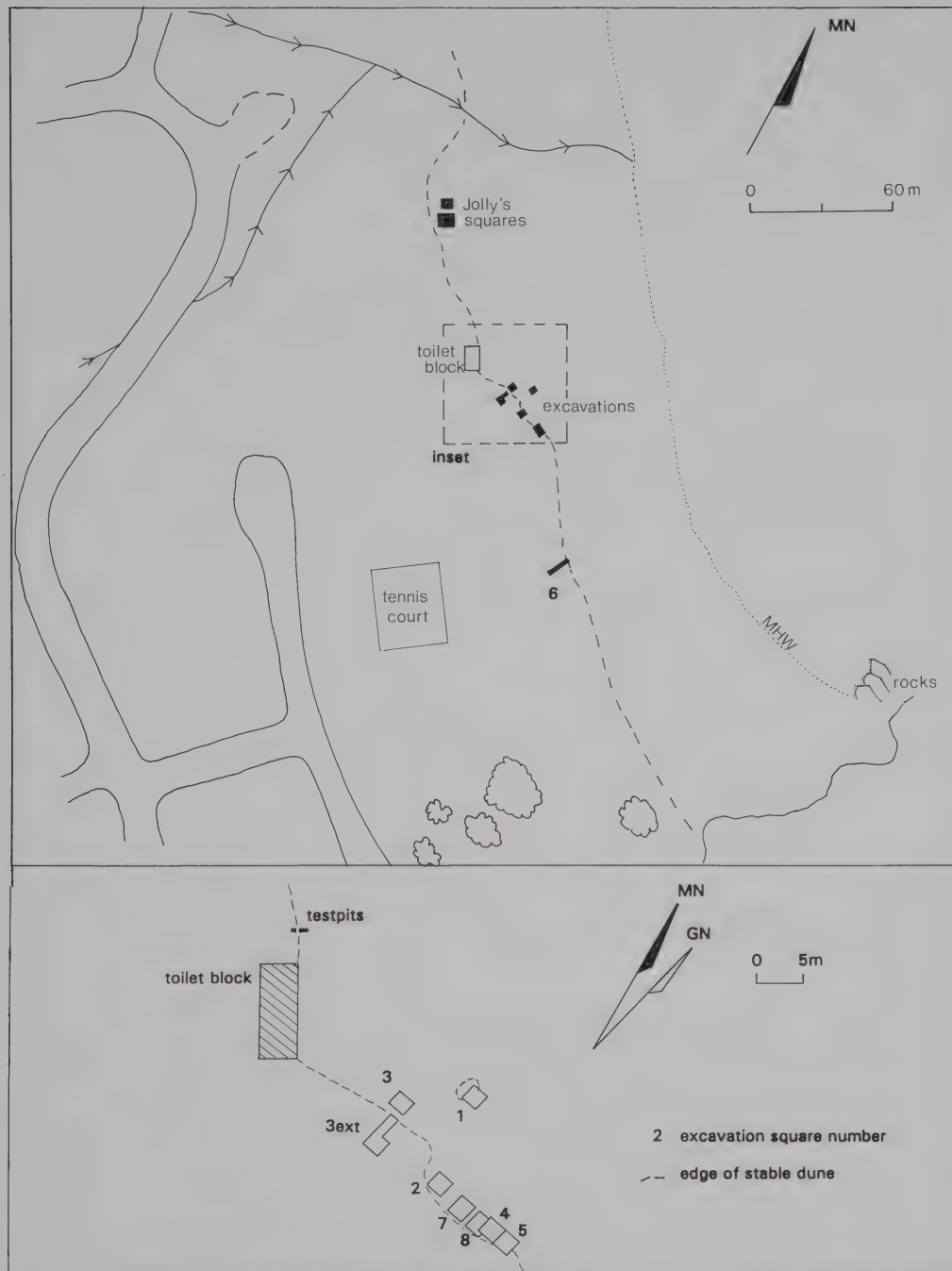


Fig. 3. T12/16, showing recent excavations and Jolly's Site 1 and 2.

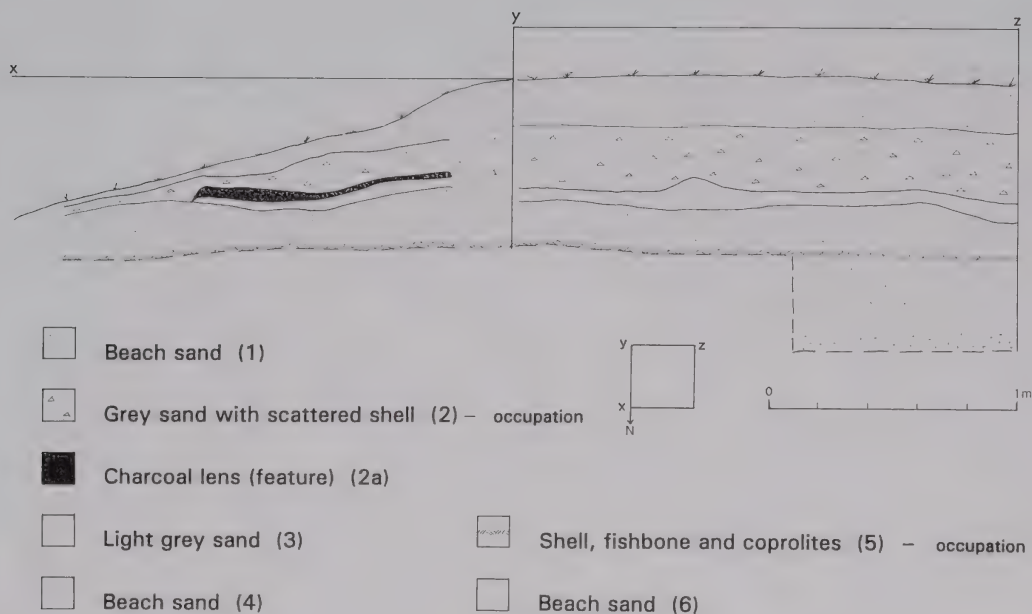


Fig. 4. T12/16, Square 2, stratigraphy.

interpreted as decomposed bone. The midden was not concentrated. Several pipi shells had small pressure flakes removed from one side and are likely to have been used as scrapers. Five flakes of obsidian and one of chert were also present, none of which had use-wear.

Three pieces of worked moa bone were also recovered from Layer 2. One piece (Fig. 20) had a cut mark and evidence of a chisel scar at one end, indicating the method used to break the bone.

One posthole and two firescoops were dug from the Layer 2 level (Fig. 5). The posthole was 130 mm in diameter and approximately 250 mm deep. A possible posthole with a diameter of 200 mm was also present but the base and sides of the hole were not clearly defined. One firescoop contained a dense black charcoal deposit, burnt stones and mussel shells filled with white sand, and was dug from within Layer 2. The other firescoop was evident in section (Layer 2a on Fig. 4).

The shell midden (Layer 2) rested on a light grey sand (Layer 3) the colour of which is probably attributable to water percolating through the charcoal and staining the underlying sand. This layer was culturally sterile. Layers 4 and 6 were also sterile white beach sand separated by a thin cultural horizon (Layer 5) which consisted of mussel shells, coprolites and the occasional piece of charcoal.

Square 3. At first a 2 x 2 m square was placed over what was interpreted as the eroding edge of the cultural material but the square was extended into the intact dune when it was found much of the initial area was disturbed. In the Square 3 extension, connected

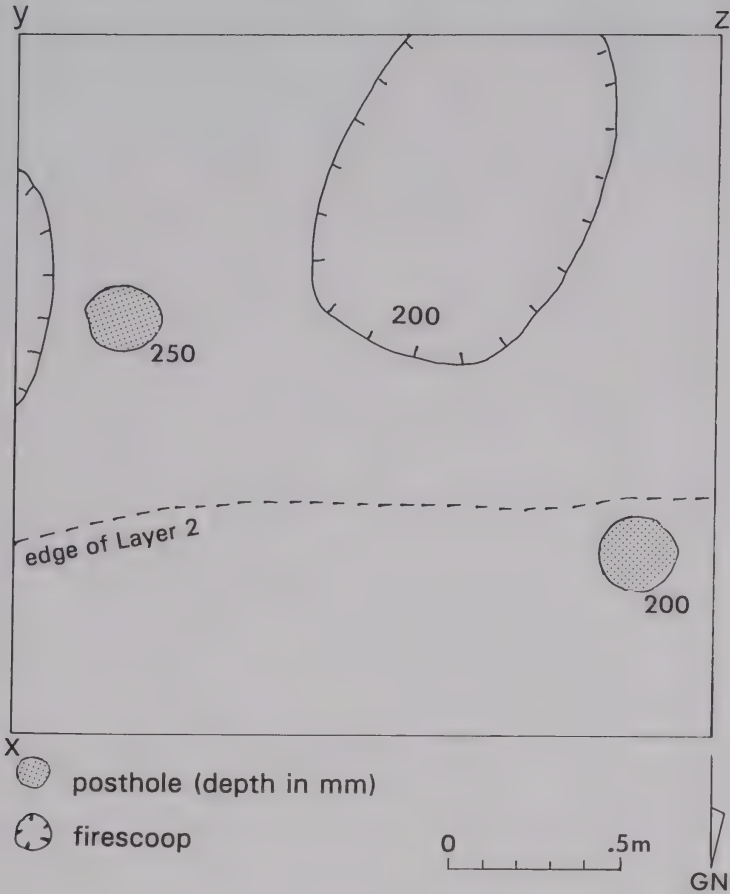


Fig. 5. T12/16, Square 2 features, Layer 2.

to Square 3 by a 3 x 1 m trench, intact cultural layers were found under redeposited material. The stratigraphic section is illustrated in Fig. 6; layer descriptions are as follows.

Layer 3 consists of a mix of sand, silt and loam with lumps of clay 50-200 mm thick, and is most likely related to the earthworks associated with the 1974 subdivision. Therefore Layer 2, which contained sparse cultural material, was redeposited, possibly during construction of the nearby toilet block.

Several occupation levels are evident in the underlying layers, each separated by sterile sand. Two occupations were excavated in plan, and the earliest cultural layer (Layer 11) was exposed in a test-pit. Unfortunately lack of time prevented this layer from being further investigated.

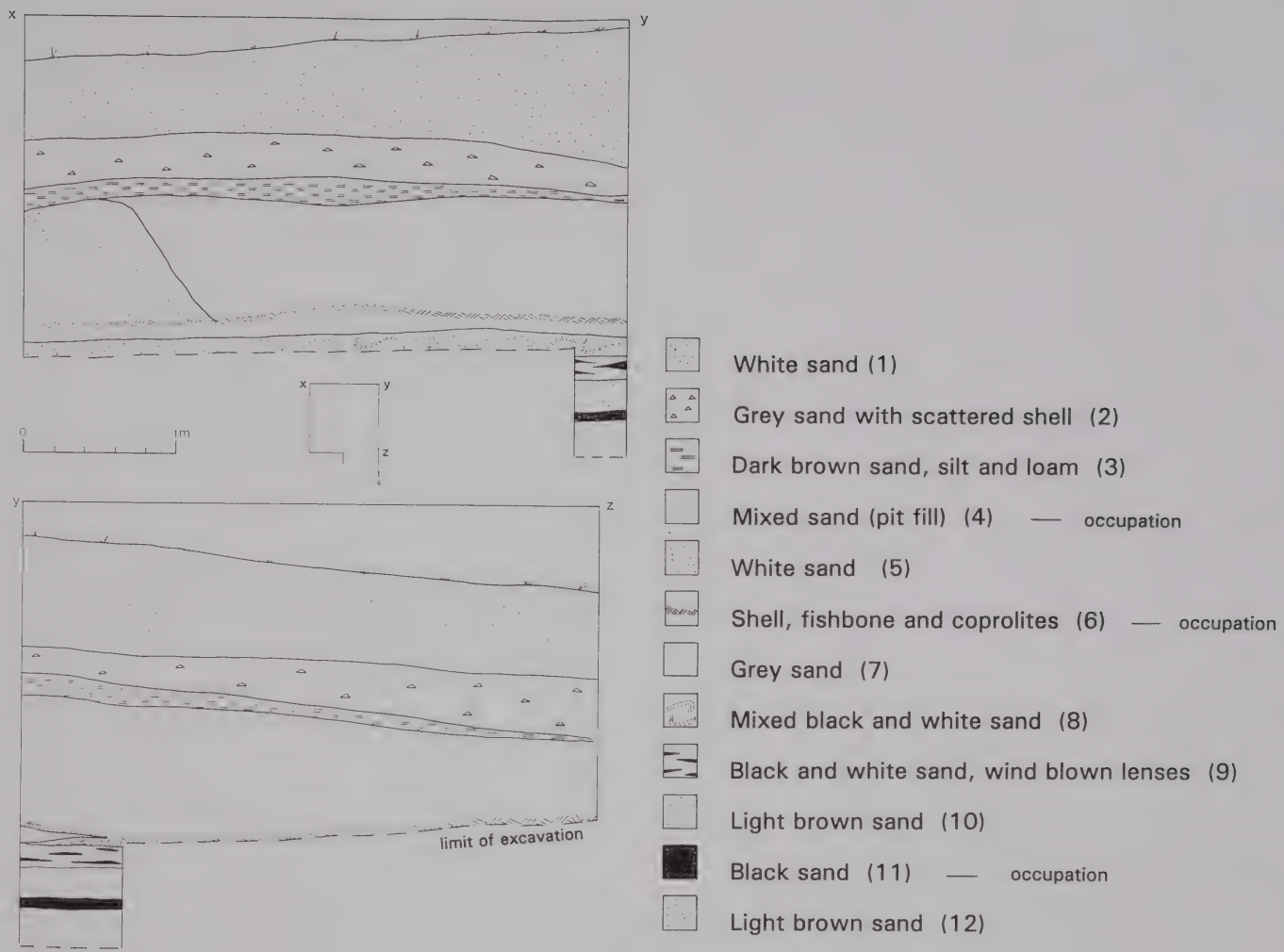


Fig. 6. T12/16, Square 3ext., stratigraphy.

The upper occupation level was characterised by a pit dug into light brown sand (Layer 5). The pit fill (Layer 4) consisted of very mixed sand with charcoal fragments included, and varied from white and light brown to black in colour. Several artefacts, including a small argillite chisel (Fig. 15), part of a one-piece bone fishhook, a piece of worked bone, two obsidian flakes, a small piece of kokowai and a lump of white clay were recovered. Into the upper level of the pit fill were cut two firescoops, overlapping but at different levels (see Fig. 7). The upper firescoop was 150 mm deep and contained black sand, ash, and fragments of charcoal with scattered shells of pipi and cat's eye. The earlier scoop, 120 mm deep, was filled with black sand with a concentrated area of charcoal in the centre.

The eastern wall of the 800 mm deep pit ran diagonally across the square. The pit size was not established, nor the place at which it intersected the western baulk of the associated trench, as the surface layers only were removed from this area. The pit must exceed 2.5 m in length on the north-west/south-east axis.

Four postholes were excavated outside the pit on the eastern side of the square (Fig. 8). It was not clear whether they related to the period of pit use, or to the later use of the area, evident from the firescoops.

The second clear occupation in this area is represented by Layer 6, consisting of a thin layer of mussel shells, charcoal, fish bone and coprolites. This layer represented the base of the pit but also extended under the pit wall. The mussel shells and coprolites formed a distinctive and easily recognisable layer evident in all squares across the site.

Layer 7, a grey charcoal stained sand, suggests some fire or cooking related activity in the vicinity although no evidence for it was found in this square. Similarly the mottled black and white sand of Layer 8 suggests human activity.

Layers 9 and 10 represent natural build-up, suggesting a period of abandonment. Layer 11 was a black charcoal rich layer, 50 mm thick, sitting on sterile light brown sand, and is the earliest occupation in this part of the site. This layer was not evident in squares to the east.

Squares 4 and 5. These adjacent squares were placed to investigate a dark coloured cultural horizon evident beneath loose sand overburden. Stratigraphy in both squares was very similar (see Fig. 9). Three separate occupations are represented, two of which indicate food preparation, cooking and waste disposal.

Layers 1 and 1a, loose dune sand and a thin silty sand respectively, are recent depositions, with Layer 1a dated to the 1974 subdivision construction.

Layer 2 was a shell midden in a matrix of charcoal stained sand with firescoops and fire rake-out indicated by Layer 2a. Shell midden in Layer 2 consisted of crushed and whole shells (some lensing evident) of a number of species of shellfish from a range of environmental situations (Table 2). Fish bones, a fragment of dog bone, coprolites and burnt stones were also present. Pipi shell scrapers, a fishhook fragment, part of a fishhook blank, two sandstone files, a bone chisel, obsidian flakes and worked moa bone were recovered from the midden during sieving.

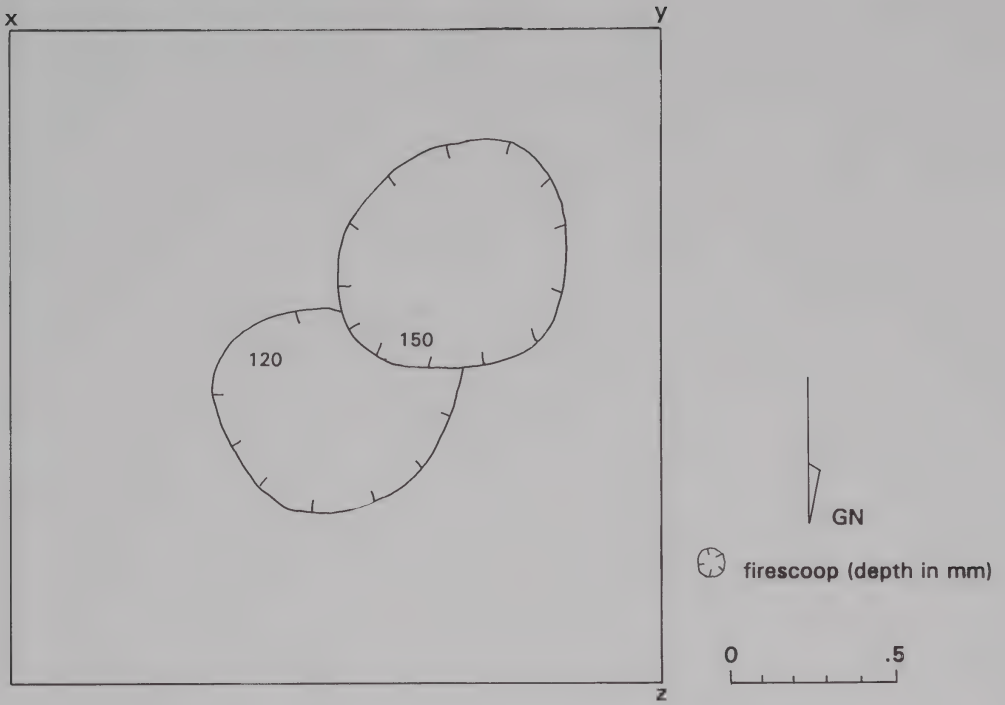


Fig. 7. T12/16, Square 3ext. features, Layer 3.

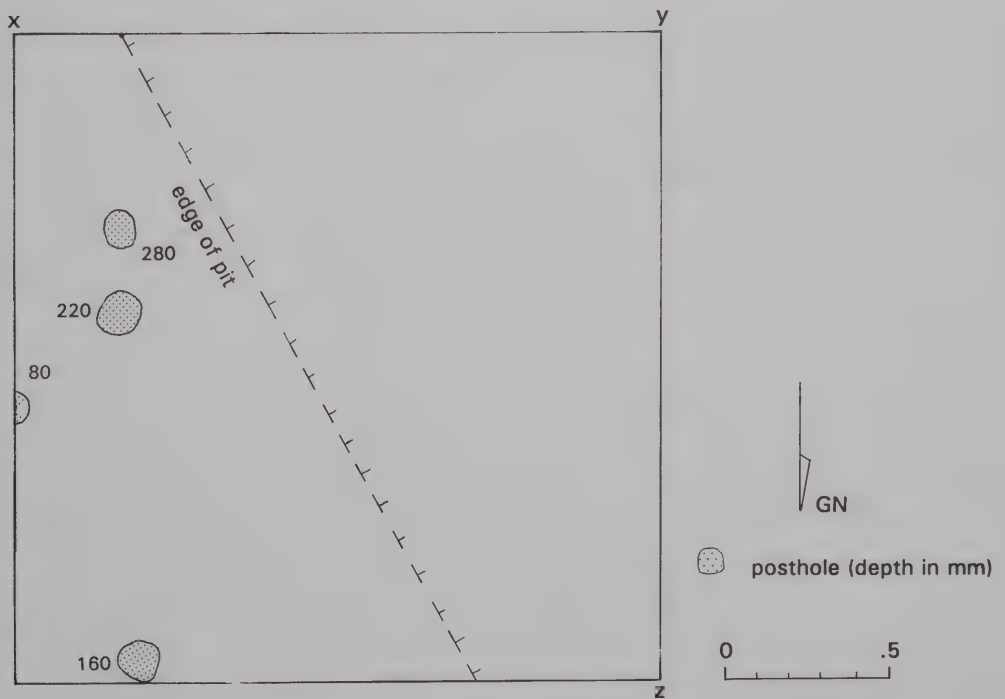


Fig. 8. T12/16, Square 3ext. features, Layer 4.

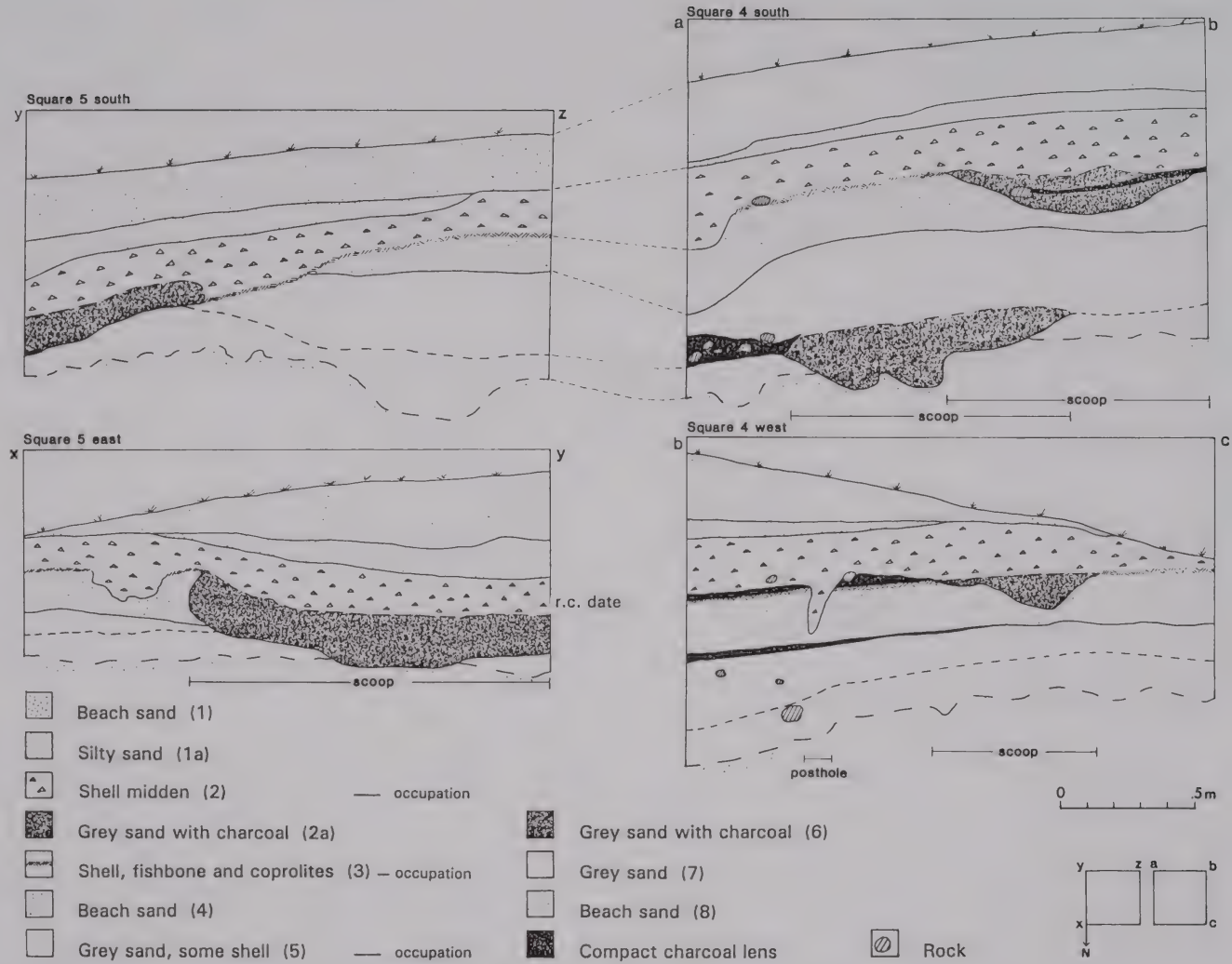


Fig. 9. T12/16, Squares 4 and 5, stratigraphy.

Six firescoops occurred within Layer 2 in Square 4 (Fig. 10). Four were less than 500 mm diameter, while the largest was in excess of 1 m. Three firescoops were present in Square 5, two over 1 m in diameter, the scoops occurring at differing levels within Layer 2. The contents of the scoops were similar with crushed midden, fire blackened stones and a basal lens of greasy charcoal stained sand. In Square 4, three postholes were found dug from within Layer 2 into the underlying layers. One posthole was present in Square 5.

Layer 3 in both squares was a thin layer of mussel shell, fish bone and dog coprolites overlying sterile white sand (Layer 4). The shell and coprolite layer was absent where it had been cut by firescoops at the base of Layer 2.

Layer 5 was dark grey stained sand with charcoal fragments, probably originating from Layer 6 which contained several firescoops — three in Square 5, and one in Square 4 (Fig. 11). Midden was sparse and consisted of mussel and cat's eye shells, fish bone and obsidian and basalt flakes. A fire blackened basalt adze roughout was present in Square 5, Layer 5, and a fragment of moa bone in Square 4, Layer 5.

Layer 7 was grey sand, stained from water percolating through the charcoal in the layer above. No cultural material was found. Layer 8 was white beach sand.

The evidence from Squares 4 and 5 is consistent with food preparation and cooking in the earliest and latest occupations, with midden dumping also occurring in the later occupation. The build-up of charcoal rich sand and shell layers can be attributed to fire rake-out.

As in the other excavated squares, Layer 3, representing the middle occupation, was very uniform with mussel shells and dog coprolites on white sterile sand. Dogs apparently also scavenged over the midden waste as coprolites were found in Layer 2.

Squares 7 and 8. Squares 7 and 8 were excavated in 1988 to define occupation surfaces in the unexcavated area between Square 2 and Squares 4 and 5 (Fig. 3), and to obtain more shell from the earliest occupation layer for radiocarbon dating.

Cultural layers were more numerous than in other squares excavated, but the evidence fits in with a three-phase occupation. The amount of shell midden indicates this was more of a dumping than a cooking area, unlike Squares 4 and 5. The following description of the stratigraphy refers to Fig. 12.

The cultural layers were sealed by loose beach sand (Layer 1) and a brown sandy loam (Layer 1a) containing shell and unmodified cobbles of obsidian which are to be found through the clay subsoil in this area.

Layer 2 was shell midden, similar in appearance to that found in Squares 2, 4 and 5. The shell was very crushed and burnt. Species present were mussel and pua in abundance, with *Cellana radians* (limpet), pipi, *Cookia sulcata* (Cook's turban), cat's eye, *Cominella*, *Thais orbita* and cockle also present. Lenses of individual species were evident. Oven stones and charcoal pieces were also present. Fragile and fragmented bone occurred throughout but was too decomposed for recovery. As all the pieces

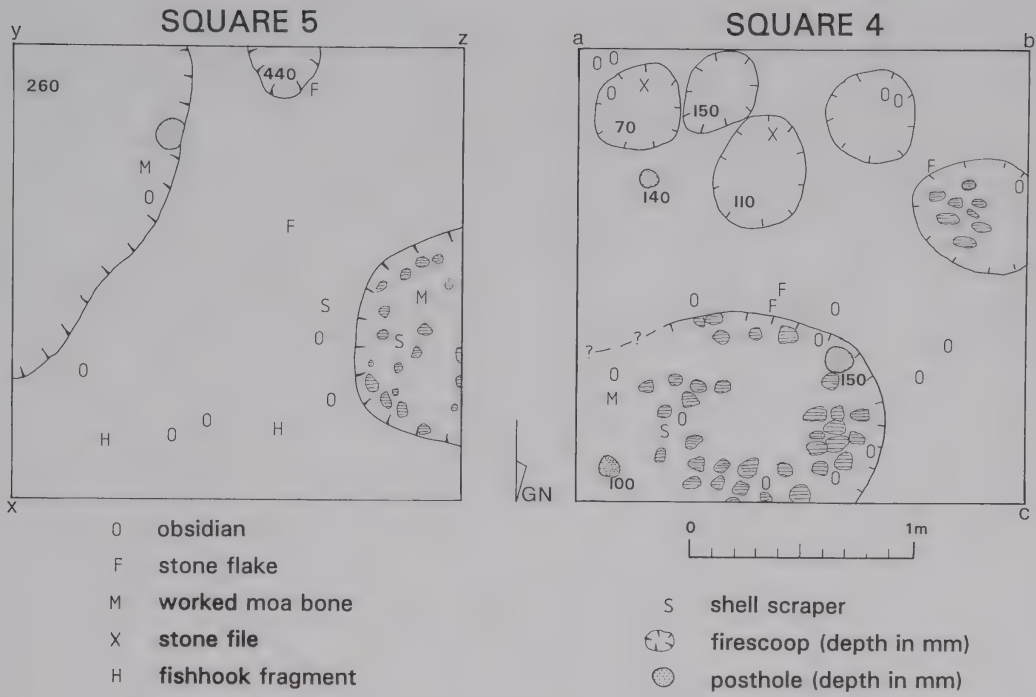


Fig. 10. T12/16, Squares 4 and 5 features and artefact locations, Layer 2.

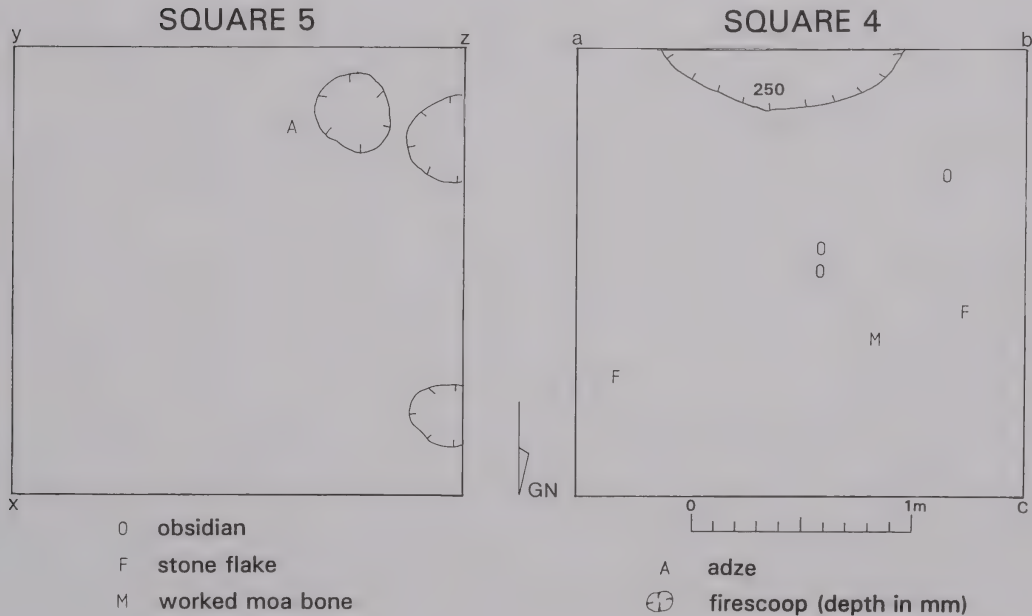


Fig. 11. T12/16, Squares 4 and 5 features and artefact locations, Layer 5.

were small, it is likely to have been fish bone. Layer 2a was a greyish black stained sand containing sparse shell, consisting mainly of pipi, and appears to be a fire rake-out. One firescoop containing charcoal, ovenstones and black sand was dug from Layer 2a in Square 7.

Layers 3, 5 and 7 were sterile white sand, with Layer 6, a distinctive mussel shell layer, separating Layers 5 and 7.

Layer 4, present only in Square 7, was a very concentrated fragmented midden, up to 100 mm deep, consisting mainly of mussel shells, with very small quantities of other species such as pipi and cat's eye, and one *Cellana denticulata*. Coprolites and fish bone were also present. This layer was cut into by a firescoop originating from Layer 2a.

Layer 8, equating with Layer 5 in Squares 4 and 5, consisted of black sand with sparse shells and lenses of concentrated charcoal (see Table 2 for the midden analysis from this layer). A posthole visible in the Square 8 section (Fig. 12), originated from this layer. Fingers of Layer 8, interlaced with sterile sand called Layers 7 and 9, occur in Square 7. Layer 10, similar to Layer 6 in Squares 4 and 5, consisted of dark grey stained sand and charcoal lenses, resting on sterile sand (Layer 11).

Square 6. At the southern end of the site (Fig. 3) surface evidence indicated a large concentration of flaked stone material and bone. The intention with Square 6 was to investigate the depth of occupation at what appeared to be the periphery of the site. A trench 7 x 1 m was laid out through the exposed cultural layer and back into the dunes and two 1 x 1 m squares (Areas A and B) were excavated. Square 6B stratigraphy was as follows (see Fig. 13).

Layer 1 was modern dune sand with a small charcoal lens (Layer 1a) within it. Layer 2 consisted of a thin lens of dark brown sandy loam with some pebbles scattered throughout. This is likely to have originated during the construction of the tennis court above the site.

Layer 3 was a light brown coloured sand up to 150 mm thick with charcoal and some shell. Fish bone and a fragment of dog bone were also present.

Layer 4 was similar to Layer 3 but contained more charcoal and large shells of pipi, cockle, cook's turban, cat's eye and mussel. Analysis of midden samples is shown in Table 2. Fish bone identifications are presented in Table 3. A concentration of fire blackened stones and *in situ* charcoal, interpreted as a hearth, were situated at the base of the layer. This layer rested on clean beach sand.

The occupation surface appeared to be level and extended under the dune overburden. Because of the distance from the remainder of the excavations it is not possible to stratigraphically tie the occupation evidence from Square 6 with the rest of the site.

Layer 3, with a large amount of organic matter, could possibly be interpreted as a paleosol although the quantity of shell and charcoal mixed throughout suggests it

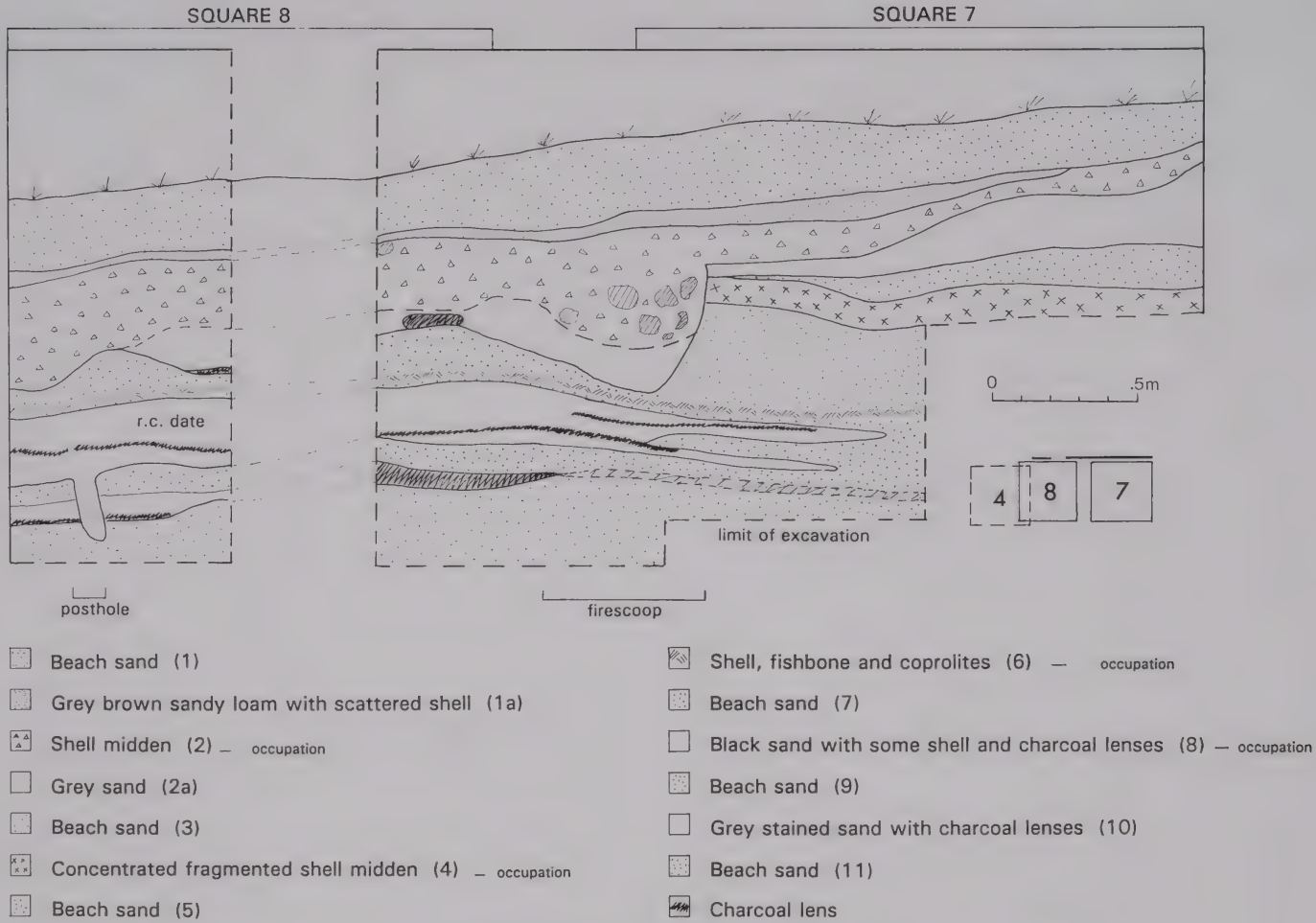


Fig. 12. T12/16, Squares 7 and 8, stratigraphy.

was not *in situ*. Square 6A, located near the eroding edge of the dune, had the same loamy sand under the midden layer, minus the shells and charcoal. This is interpreted as an *in situ* paleosol.

STRATIGRAPHY AND OCCUPATION SEQUENCE

Three separate periods of activity, separated by sterile sand layers, can be identified. Stratigraphy was fairly uniform across the squares excavated and occupation layers were readily identified (Fig. 14). Evidence of the first occupation level (I) is present at the eastern end of the excavations while occupation levels II and III occur in all squares with the exception of Square 3 where the last occupation is missing, presumably removed during recontouring work associated with construction of the beach subdivision.

Occupation I. The first occupation level occurred at the eastern end of the site (Squares 4, 5, 7 and 8) and consisted of sparse shell midden in a dark grey sand matrix, with associated firescoops and postholes (Figs. 5 and 6). The layer was fading out in Square 7. The underlying sand was also stained dark grey from water leaching through charcoal lenses within the occupation layer. An adze roughout, worked moa bone, and flakes of basalt and obsidian were recovered. Shellfish species represented various marine environments with preferences indicated for mussel and cat's eye. Fragmented fish bone was also present.

Square 3 had evidence of at least one occupation level below Occupation II, but this cannot be linked up stratigraphically with the earlier level in Squares 4, 5, 7 and 8. The lensing out in Square 7 and the apparent absence of layers relating to Occupation I in Square 2 suggests that cultural material in Square 3, evident only in a test pit, may be assigned to a different event.

Pipi shells from Square 8, Layer 8, were submitted to the University of Waikato Radiocarbon Dating Laboratory. An age estimate of 690 ± 50 BP (WK 1515, new half life, reservoir corrected) was obtained.

Occupation II. This was characterised in all excavations, except Square 6, by a thin layer of mussel shells, fish bone and coprolites within sterile white sand. No features were associated with it. The absence of cooking evidence or other more substantial build-up suggests this part of the site was at the edge of the main settlement.

Occupation III. The upper occupation is characterised by midden containing a large number of shellfish species from open coast, rocky shore and estuary (Table 2). Mussel was again the dominant species. Fish bone was also present but was in a fragmentary and decomposed state, making collection and identification difficult. Firescoops and a posthole occurred, and in Square 3 a feature interpreted as a pit can also possibly be assigned to this occupation (Fig. 8).

Artefacts included obsidian flakes, two file fragments, fishhook fragments, a bone chisel and worked moa bone. Pipi shells with edge damage were also present. A chisel in the fill of the pit feature in Square 3 cannot positively be assigned to this occupation level as the fill may have been redeposited from elsewhere on the site.

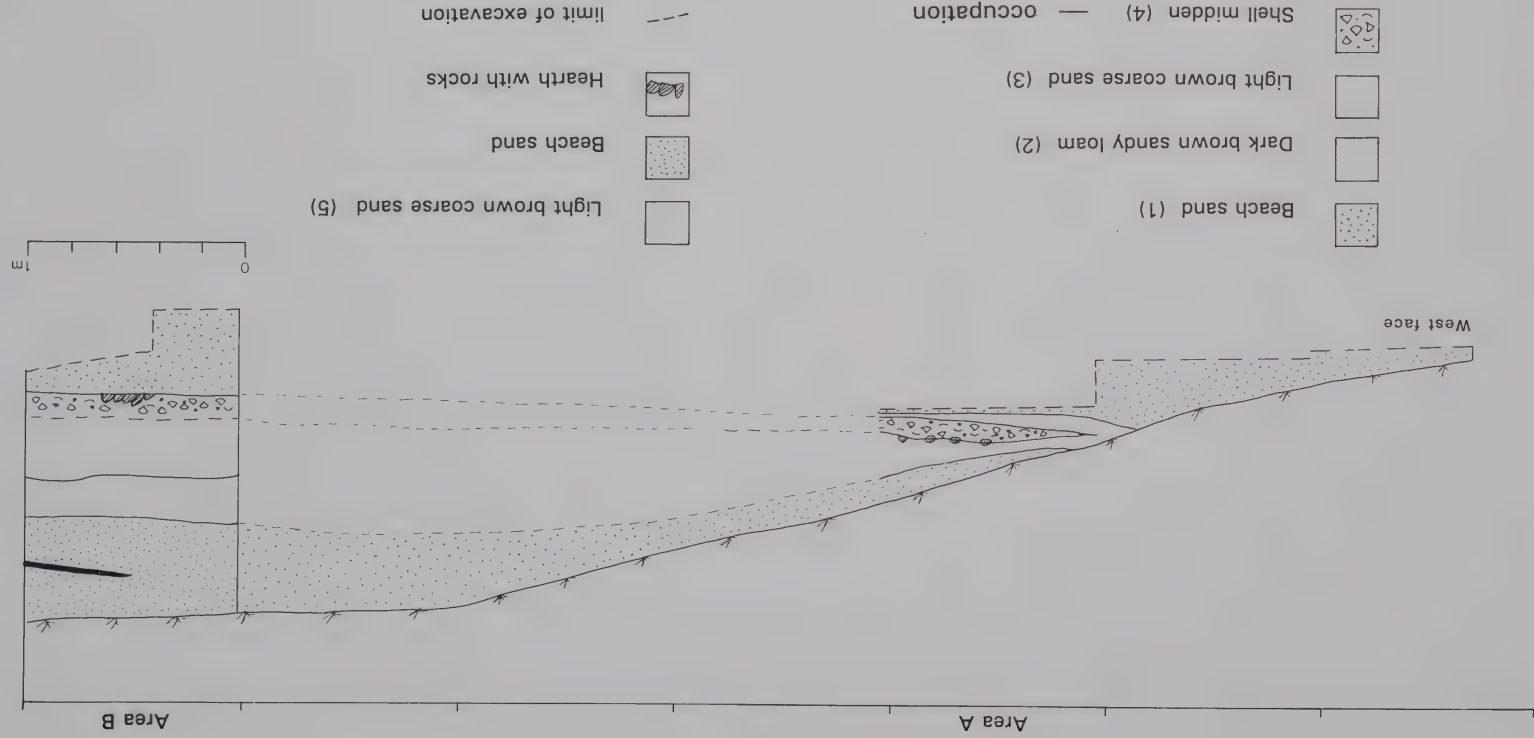


Fig. 13. T12/16, Square 6, stratigraphy.

This occupation occurred in Squares 2, 4, 5, 7 and 8. An underlying grey sand layer, representing charcoal staining from the firescoops was also present. The midden layer was absent in Square 3 but the pit was in a stratigraphically correct position to be assigned to this occupation. Two firescoops were dug into the surface of the pit fill and had been overlain by the subdivision spoil. A midden layer occurred above this, and although similar to Layer 2 must have been redeposited after 1974 (Fig. 6).

Only one side of the pit was found, dug into sterile sand. The base of the pit was above the mussel shell layer which characterised Occupation II. Four postholes were present on the eastern side of the square but the angle of the line indicates they did not support a roof structure over the pit.

An age estimate of 560 ± 45 BP (WK 1169, new half life, reservoir corrected) for this occupation was obtained on cockle shells from Square 5, Layer 2.

STONE MATERIAL

Obsidian, basalt and chert were recovered. Obsidian was more abundant than the other two stone types. Squares 4, 5 and 8 had the greatest concentration of material.

Obsidian

A total of 92 obsidian pieces were excavated, 63 from Layer 2. The majority were waste flakes (89%), nearly all under 40 mm in length, although very small flakes or chips were not represented even in sieved samples. This suggests flaking occurred elsewhere on the site and waste material was thrown into the midden area. The very low concentration of stone material is another argument against flaking having occurred *in situ*.

Squares 4, 5 and 8 had the highest concentration of obsidian flakes in Occupation III. By comparison, few flakes were found in Occupation I (Table 1).

Table 1. Obsidian flake distribution by square and occupation layer.

Square	1	2	3	4	5	7	8	6	%
Occupation III		5		24	17	4	14		69
Occupation I				2		4	4		11
Undetermined	8		4					6	19

Grey, grey-brown, green and a milky grey-green obsidian were identified in transmitted light. Following Moore (1988:12, 16) the most likely source for the grey and grey-brown obsidians is Whangamata, including Onemana, although they are also similar to obsidian from Ben Lomond in the central North Island (Moore pers. comm.). Clearly a local source is most likely. Green obsidian is most likely derived from Mayor Island. A milky grey-green flake is probably also from Mayor Island despite its unusual colour. None of the flakes matched samples from the Waihi source (Moore, pers. comm.).

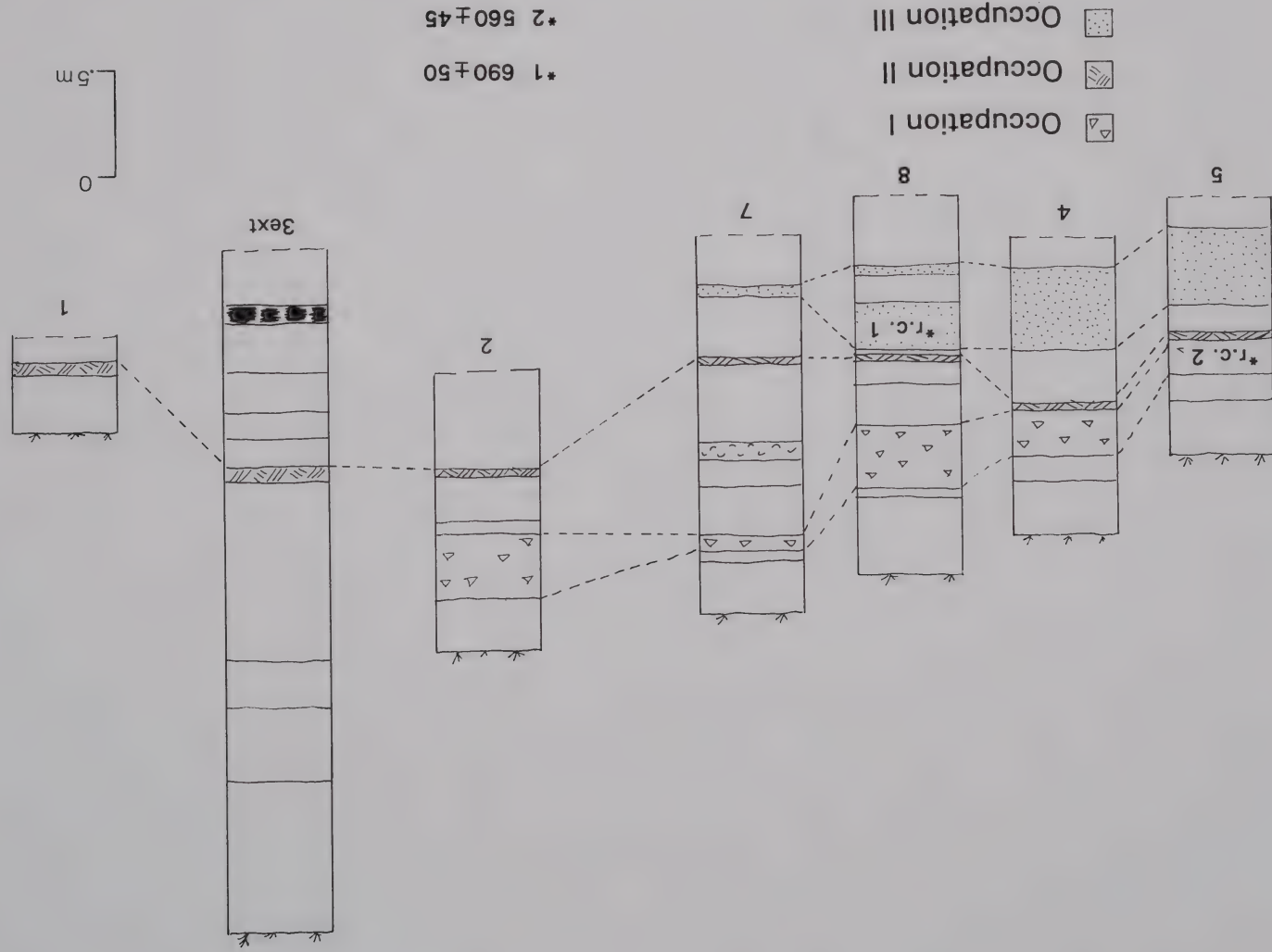


Fig. 14. T12/16, generalised composite stratigraphic sequence across excavated area.

Grey obsidian provisionally sourced to the Whangamata area accounted for 87% of the flakes from Occupation III and all from Occupation I. This accounted for 89% of the total assemblage. Ninety per cent of grey flakes had cortex present, curved cortex surfaces suggesting the cobbles were relatively small, perhaps fist-sized or less, which fits with the size range of the obsidian found naturally in the area.

The high proportion of what is in all probability local obsidian does not fit the pattern evident in other early sites, even when a source is adjacent to a site (for example, Whangamata Wharf Site, Allo 1972:66; and Harataonga, Law 1972:92). Indeed, the preference for Mayor Island obsidian has often been taken as an indicator of an early age (Green 1964:134-143). One suggestion to account for the high proportion of local obsidian at Whitipirorua, and which will be explored in more detail later, is that the presence of local stone materials in a site may be an indicator of the type of settlement and the duration of occupation. The exploration of the local area to find, and use, suitable stone implies a base camp or village situation, whereas importation of obsidian from another area suggests people primarily engaged in other activities such as hunting, and not making full use of local resources because of the short period of occupation.

Other stone

Twenty-two pieces of other stone were recovered. Basalt flakes accounted for 41%, chert 54% and quartz 5%. The distribution was similar to that of the obsidian: Squares 4, 5, 7 and 8 had 73% of the basalt, chert and quartz.

Chert was generally of poor quality, flaking in an irregular fashion. All pieces had cortex. It is likely that all chert originated in the local area. One piece, with a crystalline sugary cortex, is similar to material from chert outcrops on the central ridge of the Whitipirorua Peninsula (J. Coster and P. Moore pers. comm.). There is a chert outcrop on the beach below T12/21 and chert pebbles with a water-rolled outer surface also occur on the beach.

Included in the basalt count was one polished adze flake and a flake identified as having been used as a spokeshave. Use polish is present where the tool is likely to have been held. The curved 'bite' in the flake had a diameter of 5 mm. One other piece has use polish or patina on the ridges of flake scars on one side and has a straight edge 15.5 mm long which may have been used as a scraper or chisel.

MIDDEN ANALYSIS

Shell

Shell samples were collected from Squares 4, 7, 8 and 6, representing all three occupation levels. In each case a 500 mm quadrant of the layer was bagged for analysis. The samples were sorted and minimum numbers obtained on all species present. The results are shown in Table 2.

Table 2. Shell midden analysis, T12/16, Whitipirorua.

Square	4	7	8	6
Layer	2	4	8	5
Occupation	III	II	I	
Rocky shore				
<i>Perna canaliculus</i>	202	35	11	168
<i>Turbo smaragdus</i>	31		10	23
<i>Cellana radians</i>	3		3	6
<i>Haliotis</i> sp.	3			1
<i>Thais orbita</i>	2		1	4
<i>Nerita (Melanerita) atramentosa melanotrogus</i>	2		3	4
<i>Cookia sulcata</i>				3
<i>Xymene ambiguus</i>	2			
<i>Maoricrypta costata</i>	9			6
<i>Crassostrea glomerata</i>	2			10
Sandy shore				
<i>Paphies (Mesodesma) subtriangulata subtriangulata</i>	6			28
<i>Dosinia</i> sp.	1			
<i>Tawera</i> sp.	1			
<i>Umbonium (Zethalia) zelandicum</i>	10			1
<i>Divaricella (Divalucina) huttoniana</i>			2	
<i>Pecten novaezelandiae</i>			1	
Estuary				
<i>Chione stutchburyi</i>	47		1	70
<i>Paphies australis</i>	38		3	40
<i>Amphibola crenata</i>	14			6
<i>Cominella</i> sp.	4			4

The dominant shellfish species in all squares was *Perna canaliculus* (mussel). This was particularly apparent during Occupation II where mussel was the only species present, demonstrating a highly selective gathering practice.

In other occupations a range of species was collected from the rocky shore and also from a soft shore or estuarine environment. Onemana Beach has an extensive rocky coastline to the north and south, with potential for large mussel beds. The nearest sources of estuarine shellfish are Whangamata Harbour, on the western side of the Whitipirorua Peninsula, and Wharekawa Harbour to the north (Fig. 1). Sandy shore species are poorly represented which may be explained either by selective gathering or by species such as *Paphies subtriangulata* (tuatua) being locally scarce during the early period of settlement. Interestingly tuatua were a minor species at the Whangamata Wharf site although the shellfish are common on the beaches in the area today (Allo 1972:71). In contrast to many early sites, shells of all species were not particularly large, perhaps reflecting that the environment had previously been harvested.

Fish bone analysis

A preliminary analysis of fish bone from Squares 1, 4, 5 and 6 has been carried out. Actual numbers of individuals in each species have not been ascertained because of small sample sizes. Results are presented in Table 3. *Chrysophrys auratus* (snapper) was the dominant species in each square and layer, a predictable result for a midden of an early age.

Squares 4 and 5 had a very restricted range of species with snapper and *Pseudolabrus* sp. (labrid) present. Square 1, in all layers, had a large number of species and individuals. Snapper, labrid, *Arripis trutta* (kahawai), *Parapercis colias* (blue cod), stargazer and other unidentified species were caught. Square 6 had a wider range of species and larger number of individuals. Reg. Nichol (pers. comm.) suggested that the presence of pelagic fish species such as *Trachurus declivis* (jack mackerel), *Scomber australasicus* (blue mackerel) and *Thyrsites atun* (barracouta), and a generally wider range of species in Square 6 suggests a 'late' date. This is not supported by the other archaeological evidence but neither does it confirm the contradictory view of an early date.

Many of the fish species could have been caught close to the site, particularly from the rocky coastline. Barracouta and the mackerel species would have been trolled further off-shore in deeper water.

Table 3. Fish species by square and layer, T12/16.

	Square 1			Squares 4 & 5			Square 6		
	S	L1	L3	L2	L3	L4	S	L3	L4
<i>Zeus faber</i>									x
<i>Chelodoniichthys kumu</i>								+	x
<i>Trachurus declivis</i>									x
<i>Arripis trutta</i>		x	x					x	?
<i>Chrysophrys auratus</i>	*	*	*	*	*	+	+	*	*
<i>Aldrichetta forsteri</i>							x	x	+
<i>Pseudolabrus</i> sp.		+	+	x		x			+
<i>Parapercis colias</i>		x	x						
<i>Thyrsites atun</i>								x	x
<i>Scomber australasicus</i>								x	
<i>Parika scaber</i>								+	
<i>Latridopsis ciliaris</i>				x				x	
?Stargazer			x						
Spiny dogfish								x	
Other	x		+	x			x	+	*

x = present; + = more than 1 individual; * = several
S = surface

A variety of capture techniques would have been necessary. Most species of in-shore fish could have been taken by bait hook or net while the pelagic fish would have needed trolling hooks and lures. Bait hooks of varying sizes are represented from the

site, as are trolling shanks and hooks (Furey 1990). Evidence of nets and traps rarely survive archaeologically.

The species list is similar to that from other Coromandel Archaic sites, although minimum numbers of each species is small. However this is misleading as it represents only the bone able to be recovered and identified. Much of the fish bone, especially from Occupation II, was in a fragile and poorly preserved condition.

Other bone

Very little bird and mammal bone was present in the middens. Two *Eudyptula minor* (blue penguin), from Occupation III in Square 2 and Square 7/8 baulk, one *Puffinus assimilis* (little shearwater) from Square 4 Layer 4, and one *Puffinus griseus* (sooty shearwater) from the surface of Square 7 were identified. Fragments of moa bone from the surface of Square 7 were also present.

Canis familiaris (dog) was identified by vertebrae, mandible and cranial fragments from Squares 4 and 6. A minimum of two dogs is represented. A phalange of *Arctocephalus forsteri* (fur seal) from Square 2 Layer 2, and a cranial fragment from either a fur seal or *Phocarctus hookeri* (sea lion) was in Square 5 Layer 2 which, together with unspiciated fragments of sea mammal from Square 4 Layer 2, can be assigned to Occupation III.

Cetacean bone was present in Square 3 extension and in Squares 7 and 8.

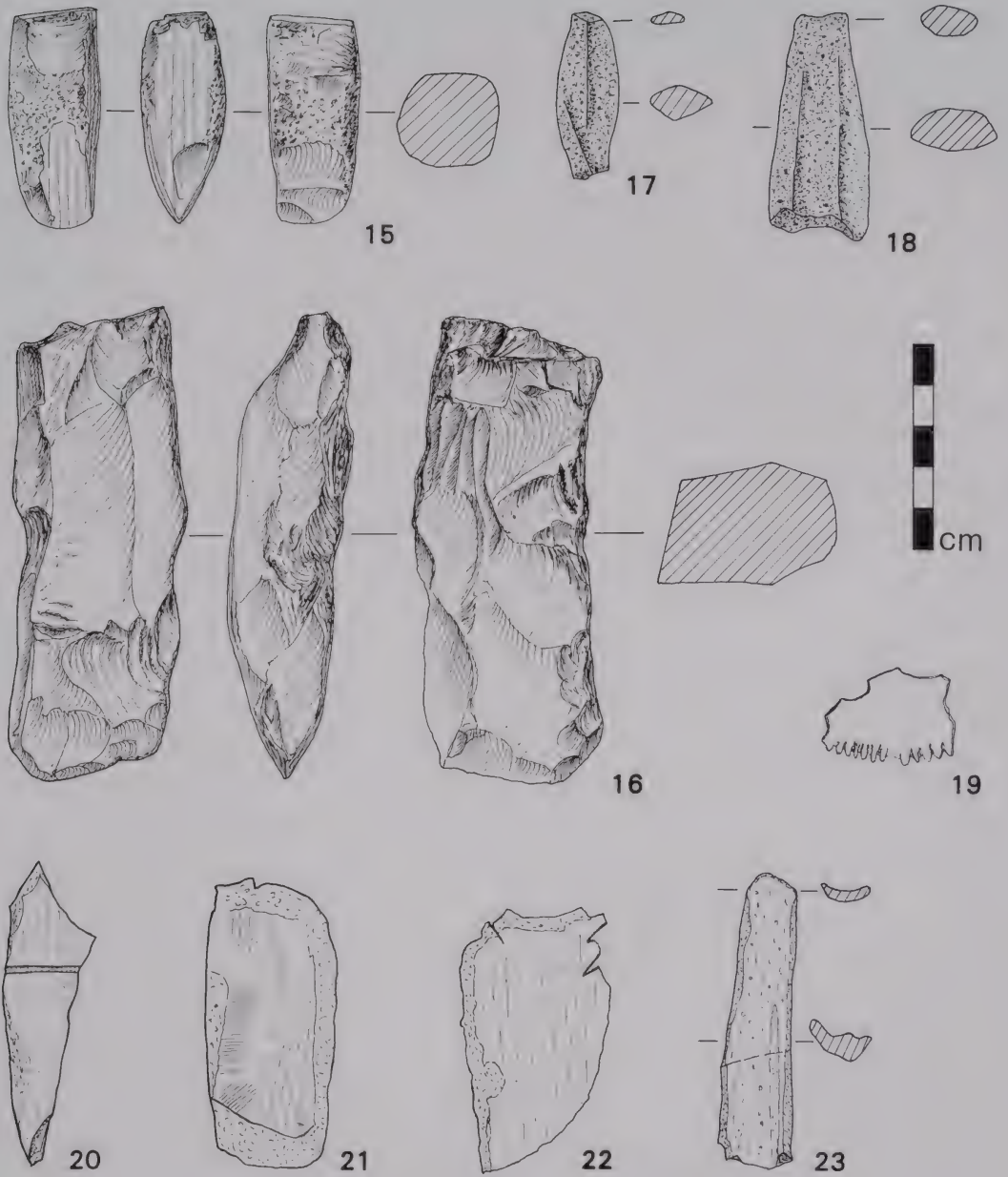
All of the bone was fragmented, perhaps reflecting scavenging by dogs. No bone was recovered from the lowest occupation level (I).

ARTEFACTS

Few artefacts, either finished or in the process of manufacture, were recovered. One argillite chisel, a basalt roughout, several fishhook fragments, a piece of worked paua shell, two stone files, a bone chisel, eight pieces of *Dentalium* shell and several pieces of worked bone make up the assemblage. All material is now in the Auckland Museum.

The chisel, Auckland Museum catalogue number AR7741 (Fig. 15), made from metasomatised argillite, was recovered from the fill of the pit in Square 3. Rounded in cross-section, it most closely resembles Duff's Type 6 gouge. Polish occurs on one side and on the back near the blade, with less on the front, also near the blade. Hammer-dressing also occurs on the front and back and on one side. Flake scars and an irregular blade indicate considerable damage which made the chisel unusable in its present form. The blade width is approximately 13mm. The chisel is unique in the wider collection of artefacts from the site in respect of both material and shape. All the adzes from the site held in the Auckland Museum are of basalt and tend to have rectangular or irregular cross-sections (Furey 1990).

The basalt adze roughout AR7745 (Fig. 16) was found in Square 5, Layer 4. Flaked all over, the roughout has polish on front and back and a small amount on one side. The cross-section is quadrangular with the back slightly narrower than the front.



Figs. 15-23. T12/16, excavated artefacts. Adzes. 15. AR7741. 16. AR7745. Sandstone files. 17. AR7742. 18. AR7743. Worked shell. 19. AR7737. Worked bone, moa. 20. AR7738/1. 21. AR7738/2. Worked bone, whale. 22. AR7740. Bone chisel. 23. AR8327.

The blade is flaked and irregular, with hammer-dressing scars on one edge probably the result of trying to reduce the blade width in this area. The plane of the adze is skewed to one side. Cortex is present on the back although this is very weathered and has considerable use-polish or patina on it.

Two sandstone file fragments were recovered from Square 4 Layer 2 (Figs 17, 18). One is rounded rectangular in cross-section, the other is roughly diamond shaped. The tips of both are missing.

An unusual artefact is made from paua shell (*Haliotis* sp.) with notching along one side (Fig. 19). This piece (AR7737) is only a fragment although grinding along one edge indicates it is an end portion. The rough cortex of the paua is present on the reverse side but it has been ground down in the vicinity of the notches or 'teeth' in the same manner as was the notched paua pendant from Sarah's Gully (Davidson 1986:224). The artefact was found in loose surface sand in Square 1 and can probably be assigned to a period earlier than Occupation II. Several similar pieces in the Auckland Museum were surface collected in recent years close to Square 1 (see Furey 1990:36).

Eight units of *Dentalium nanum*, varying in length between 11-14 mm, were found in a 500 mm quadrant in Square 1, Layer 3, equating with the same level from which the notched paua shell artefact originated. All the units are from the straight lower end of the *Dentalium* shell, suggesting the sections have been cut or snapped for threading.

Fishing gear was represented by a burnt fragment of a one-piece bone hook (possibly ivory), AR8328, and a fragment of a bone fishhook blank, AR7739/2, both from Square 5 Layer 2, and the shank limb of a one-piece bone fishhook, AR7739/1, from Square 3, Layer 4. The head has a notch cut on either side for line lashing, similar to most hooks from the site in the Auckland Museum collection (Furey 1990:29).

Three pieces of worked bone were also recovered from Layer 2. This took the form of fractured bone with cut marks, ground surfaces and chiselling. Two pieces were moa (AR7738/1, AR7738/2), the other was whale (AR7740) (Figs. 20-22).

Another piece of moa bone (AR8327; Fig. 23), very weathered and in two pieces, tapers to one end which is rounded in shape. Some working is evident on one edge at the rounded end. Rat gnawing grooves are present on the convex side. The artefact is reminiscent of moa bone chisels illustrated by Anderson (1989:156). This artefact type is not common, although examples are known from northern sites such as Houhora, and from Kaupokonui in Taranaki. None have been reported on Coromandel Archaic sites. These tools may have been used for dressing skins, although other domestic and industrial uses are also a possibility (Davidson 1984:74).

The remaining artefact type, found in Squares 2, 3, 4 and 5, was unmodified pipi shells with small chips removed from the long edge and on the curves at either end. Two shells were recovered from Square 3, ten from Square 2, six from Square 4 and four from Square 5. All came from Occupation III. Their presence in the midden suggests an activity related to food preparation. Harsant (1983:149-162) describes

shells being used for scraping vegetables and fernroot, fish scaling and cutting flesh, in addition to other activities such as scraping wood and bone. This type of artefact is not often recovered from sites, probably due to the lack of distinguishable features when present in a midden containing the same shellfish species.

DISCUSSION

Although only a small portion of a large site was excavated, evidence recovered adds to the body of information on Coromandel Archaic sites. This evidence will be discussed in relation to site layout, dating and economic information, with conjecture on how WhitiPIrorua fits into the sequence of early Coromandel east coast sites.

Features were excavated from two occupation layers separated by sterile sand. It is apparent there was an element of deliberation in the siting of features, and by association, activities. Squares 4 and 5 represent the cooking areas in Occupations I and III, while Squares 7 and 8 have the associated evidence of food remains, predominantly shellfish. By contrast, Square 3 had no food remains or cooking evidence but had postholes, and a pit of unknown function.

Occupation II, which occurred throughout excepting Square 6, is difficult to interpret as there were no features or stone material associated with it. In addition the sand was untrampled and unstained. A natural cause of the shell deposition could be ruled out by the presence of charcoal, dog coprolites and fish bone, and by the one shell species present. The number of dog coprolites suggest concentrated and perhaps contained scavenging in a midden area far removed from the cooking places, a conclusion which explains the lack of fire-related debris.

The superimposition of cooking areas from different occupations mirrors the pattern at the Cross Creek (Opito) site where cooking and tool manufacturing activities were separate. Sewell (1984:90-96) proposed that spatial relationships of particular activities at Cross Creek were governed by a cultural belief in tapu and noa where male oriented activities equating with tapu were placed at the western end of the site, and the opposing force of noa, equating with women's activities, and cooking, were directed to the eastern end of the site. This directional and activity related placement was repeated over several occupations spanning 200 years, suggesting cultural beliefs dictated site layout.

What little information is available from Jolly's excavations suggests that the selective placement of activities, as at Cross Creek, is not apparent. While there does appear to have been concentrated industrial activity (by inference male/tapu) in Jolly's 'Site 1' and 'Site 2', the samples recovered indicate that midden and cooking fires were also present although possibly not all from the same layer. It is clear, however, from the recent excavations, that during two separate occupations cooking was distanced from other activities. No evidence of *in situ* artefact manufacture was found in Squares 1-8.

Postholes and a pit in Square 3, with no food debris in direct association, suggests that this was a separate part of the settlement with a different range of activities. The lack of food debris here is important evidence, indicating the separation of cooking from what must be storage of some kind.

Pits have been found in several Coromandel dune sites, namely Hahei, Cross Creek, Hot Water Beach, N40/2 at Opito, and now Whitipirorua. The assumption in previous cases has been that the pits functioned as kumara stores but early historic accounts describe pits as having a variety of uses from housing fishing nets or implements to use as food stores. It can be assumed that these uses also occurred in the early period of settlement.

Archaeological sites excavated on the Coromandel Peninsula and elsewhere suggest that from the time of Polynesian colonisation there was a settlement system composed of different types of sites including base camps or hamlets, from which abundant local resources could be exploited and where a wide range of activities were carried out, and temporary camps set up for a particular purpose such as fishing or hunting (Davidson 1984:166-170). The position of Whitipirorua in the settlement pattern is not clear, partly because only a small area of the site has been excavated. However, several factors including the large size of the site, repeated occupations, internal differentiation of activities and the wide range of artefacts recovered (Furey 1990) encourage interpretation towards the base camp or village end of the settlement spectrum. The absence of large quantities of bone material may also show that the site was not a hunting camp of short duration where carcasses were processed and unwanted body parts discarded.

Two radiocarbon dates, obtained on shell, are available. The earliest occupation in Square 8, Layer 8, has an age estimate, uncorrected for reservoir effect, of 990 ± 50 BP (WK1515) while the upper midden deposit (Square 4, Layer 2) in the same area has an uncorrected age estimate of 870 ± 45 BP (WK1169). Using the Stuiver, Pearson and Braziunas (1986) carbon cycle calibration curve, there is a 95% statistical confidence level that the dated occupations fell within the periods 1285-1437 AD and 1352-1521 AD respectively, with median age distributions of 1359 AD and 1444 AD. The range of artefacts, typically Archaic, also suggest the site was not occupied after the 16th century.

These dates fit comfortably within the Archaic sequence on the Coromandel Peninsula. The older falls into the earliest reliable end of the sequence, fitting between Occupations II and III at Cross Creek (Sewell 1986:228-9), and is possibly of similar age to the lower level at Sarah's Gully (Green 1963:66). The upper occupation equates with Occupation III at Cross Creek and the lower level (Layer 6) at Hot Water Beach (Leahy 1971:62-3). Tairua and both Hahei sites (T11/326 and 242) fit in between the Whitipirorua occupations.

However it must be remembered that the radiocarbon dates do overlap when taken to two standard deviations and that the occupation levels dated may have been deposited closer in time, or even within the same occupation event. Recent dating of over twenty samples from the deeply stratified site at Shag River Mouth in North Otago indicate that the more dates obtained, the narrower the time range became when the results were statistically pooled (Atholl Anderson pers. comm.).

The Whitipirorua site has a number of anomalies when compared to other Archaic sites on the Coromandel Peninsula. In all occupation levels the protein component of the diet consisted primarily of shellfish. Very little bird bone, sea

mammal or dog bone was present and fish bone recovered was not extensive although decomposition may partly account for this. Moa was represented in the midden only by industrial fragments and cannot be taken as an indication that moa was on the menu. One large piece of unidentified cetacean vertebrae was found in the pit fill, as was a small cut fragment, but again these do not necessarily imply cetaceans were eaten. Most surprisingly *Cellana denticulata* was very rare in the middens (but more common in some of the samples from Jolly's excavations).

Rowlands (1976) identified *C. denticulata* as a marker species which reacted adversely to human predation and became locally extinct soon after first settlement. He also remarked that a predominantly shell midden without *C. denticulata* and with little marine mammal or bird bone, was probably late Archaic, dating to the 16th or 17th century (Rowlands 1976:8). However, Rowlands also cautioned that absence of *C. denticulata* in itself need not be proof of a site's age but should be considered along with the presence or absence of other limpet species (Rowlands 1976:13). At Whitipirorua, limpet species made a minimal contribution; thus it appears the people practiced selective gathering, especially in Occupation II where mussel is so abundant.

In addition to dietary evidence, the high proportion of local obsidian and small quantity of Mayor Island obsidian is contrary to the situation in all other Coromandel Archaic sites, even when a local obsidian source is present nearby. Obsidian samples recovered by Jolly also indicate a high proportion of local obsidian, estimated to be in excess of 80% (Furey 1990:47). Whitipirorua differs from other sites with nearby stone sources in that it is literally sitting on the obsidian source found in cobble and boulder form in the soil. Presumably the local occurrence of chert on the beach and in stream beds was a bonus which would have made the place attractive even in the earliest period of settlement.

With this combination of evidence it might be reasoned that Whitipirorua represents a late site; radiocarbon dates, however, do not support this. As there is no basis for doubting the radiocarbon dates, explanations must therefore be sought to explain why Whitipirorua goes against the general trend.

One other site, T11/242 at Hahei, presents similar evidence to Whitipirorua. Here the absence of Archaic-type artefacts, together with the absence of extinct birds, seal and Mayor Island obsidian, led Nichol (1986:179), prior to obtaining radiocarbon dates, to reject any interpretation of the site being of an early age. Radiocarbon age estimates however indicate early occupation with dates of 615 ± 54 BP and 595 ± 54 BP (Nichol 1986:197). It was apparent from analysis of the midden that *Cellana denticulata* was present but dropped out over time, and although the midden was predominantly composed of shellfish there were also shearwaters and a large number of small fish (labrids). Nichol (1986:180, 194-5), reflecting on the absence of certain body parts of birds and fish and *Turbo smaragdus* shells, suggested an important site function may have been food processing and storage, and that midden was likely to have been deposited in late summer over a period of a few weeks.

Evidence from the Hahei site indicates that there is no such thing as a typical Coromandel Archaic site and adds further data to the picture of a settlement system composed of a number of sites reflecting seasonal and general activities. Therefore the

presence or absence of certain shellfish species, or moa and seal, need not date sites but may simply reflect the activity being carried out at the time.

Coromandel sites do represent a variety of sites within the overall Archaic settlement pattern. At one end of the scale is Sarah's Gully with all the components normally associated with a village. These include house sites, storage pits, cooking and refuse disposal areas, artefact manufacture, evidence of horticulture in the form of slope drains, and human burials. Short term seasonal hunting camps are also present: Tairua, a site of small size with a limited range of activities, is an example (Rowlands 1977:138, 142), possibly occupied briefly in winter. Unfortunately too small an area of many of the other Archaic sites has been investigated to allow any conclusion on duration of occupation or seasonal hunting camps versus permanent settlements. T11/326 at Hahei had a number of the components uncovered at Sarah's Gully. It was a large site with storage pits, artefact manufacture, cooking and food disposal and burials. By inference, houses of some form should also have been present, although these were not found in the area excavated. Regrettably only a small part of Hahei was archaeologically investigated. Interpretation of occupation duration and primary activity in the remaining Archaic sites stems from the small areas investigated and the focus on midden excavation rather than in identifying associated living settlements.

Whitipiroua, because of its large size, the variety and quantity of artefacts present and components such as cooking, storage, and burials (recorded from the eastern end of the site), can probably also be placed at the more permanently occupied end of the settlement range.

Sites of an inferred early age are known from Whangamata where the Wharf Site, T12/2, (Allo 1972), Cabana Lodge, T12/2 (Jolly 1978b) and T12/3 (Shawcross 1964) were investigated with varying degrees of expertise. It is possible that all three sites are part of one large settlement but the relationship has not been established. None of the sites have been dated — the early age being inferred from the presence of moa bone and artefacts such as trolling lures and one-piece fishhooks of Opito Type I (Davidson 1984:251). Whangamata Wharf, however, has the distinction of producing a large number of individual dog remains. Apart from one moa, and a small number of early type artefacts, there was little else to readily identify the site as early.

Another early site, T12/26 (see Fig. 1), south of Whitipiroua, had moa bone, large quantities of obsidian and basalt flakes, a fragment of bone trolling lure, evidence of one-piece bone fishhook manufacturing and fragments of two shell fishhooks (Jolly 1978a).

Artefacts from all these sites bear a close resemblance to the assemblage from Whitipiroua. With the exception of Whangamata Wharf no analysis has been made of material from these sites, so that it is difficult to make other comparisons.

The contemporaneity of the northern part of Whitipiroua, investigated by Jolly, and the southern part, the subject of this paper, cannot be established. Several differences are apparent between the material recovered by Jolly and deposited in the Auckland Museum, and the content of the 1986-88 investigations.

Firstly, Jolly's samples contained large quantities of pumice, which was absent in the recent excavation squares. Secondly, *Cellana denticulata* was present in many of the midden samples, although it is not known if the samples were total samples, grab samples or species selective. By contrast, only one *C. denticulata* was present in the middens excavated. Thirdly, the amount of manufacturing debris — sandstone chips, obsidian and other stone flakes and bone fragments — is very different. Even allowing for Jolly's material to come from a much larger area, comparable samples could not be obtained from the recent excavations. The implication of much of this evidence is that Jolly's Sites '1' and '2' reflect yet another occupation, perhaps earlier in time, or alternatively represent a different type of settlement. Davidson (1979:200) in a brief summary of Coromandel Archaic sites suggested that although the artefacts in the Jolly assemblage fell within the period between mid-thirteenth and sixteenth centuries, some artefacts may have been of an earlier age.

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